



Polar physician

*Tia Renouf, MD, CCFP,
CCFP(EM)*

St. John's, Nfld.

*Correspondence to:
Dr. Tia Renouf, Faculty
of Medicine, Memorial
University of Newfoundland,
Health Sciences Centre,
500 Prince Phillip Dr.,
St. John's NL A1B 5V6;
trenouf@attglobal.net*

I have made several trips to Antarctica and the Arctic as an Expedition Physician and always hope to be the idlest member of the crew. I was part of an experienced group of boatsmen, naturalists and expedition leaders whose skills ensure safe passage aboard 2 research vessels, travelling Polar regions in search of wildlife, icebergs and isolation. From these vessels, passengers are safely taken ashore to explore remote and beautiful parts of the Polar environment.

Antarctica and the Arctic can be sunny and calm, but the weather there can change in a moment and become the most unforgiving on earth. Expertise in planning finds the balance in safely providing memorable experiences while avoiding excess risk. As the Expedition Physician my role was to deal with illness and injury as it occurred. Prevention is by far the best treatment because the ship's infirmary is only basically equipped and definitive care is a long way away; it may not be available for several hours or days, depending on weather conditions and the ship's location.

PREPARING THE PASSENGERS

Injury prevention begins right in the passengers' cabins. The Drake Passage, famous for its spectacularly wild seas, must be crossed to reach Antarctica. Passengers are taught to "Drake-proof" their quarters by securing objects that could become projectile weapons in rough weather. "Keep one hand for the ship" is a common mantra to prevent falls. Passengers must step up and over doorjambes and keep their hands out of doorways because the door may suddenly close with a lurch of the ship. Decks can be slippery, a particular

problem when passengers are in a hurry to get to a good vantage point for seeing a special event like a breaching whale.

Most days involve one or two departures from the ship on Zodiacs, small rubber dinghies that carry 12. Each Zodiac is carefully maintained to minimize engine trouble, and numerous backups are aboard to deal with unexpected problems. A "shore barrel" is brought ashore with each excursion and a "Zodiac barrel" remains with each boat. These waterproof containers hold boat repair kits, rations, water, thermal blankets, tents, sleeping bags, hypothermia suits, flares, whistles, compasses and emergency first aid kits.

In order to get to the Zodiacs passengers must descend a steep gangway, sometimes in rough and wet conditions. People's names are ticked off a list as they disembark. They have been taught to wear their packsacks on their back, thus freeing their hands to grip the handrails on both sides of the ladder. At the bottom, a sailor on the gangway hands the passenger over to a crew member on the Zodiac, using the "Sailor's grip." They immediately sit down and slide along the rubber pontoons to the rear of the craft. Packsacks are removed lest they tip the passenger backward and over the side. There is a similar procedure for exiting a Zodiac and getting ashore. Passenger understanding and compliance is the same in this setting as for medical situations; it is a great credit to an experienced crew that mishap is almost never encountered.

THE UNEXPECTED

On one trip to Antarctica a Zodiac was punctured by a piece of ice. We had been cruising the waters, looking at several leopard seals. These seals,

unique to Antarctica, have no predators and have been known to injure and kill humans. As the Expedition Physician it was disquieting to see a boat carrying 12 passengers begin to deflate among a number of curious leopards. Fortunately the Zodiac has several independently inflated chambers; though the puncture deflated one part of the boat, it remained afloat and passengers were safely transferred to another boat. This was accomplished smoothly and quickly with a notable lack of panic, testament to a seasoned and experienced crew.

THE OLDER PASSENGER

Many passengers are elderly and less than completely mobile. These people will have been identified early in the journey and will receive extra attention from the crew. The aim here is to prevent slip and fall injuries, which can range from lacerations and abrasions to fractures, dislocations and all manner of blunt trauma. Older passengers are often taking anticoagulants, clearly complicating trauma management.

The Expedition Physician accompanies the passengers on all excursions, usually having done a mental triage to assess who will be most likely in need of help. Physicians are connected via radio to all expedition staff and the ship's Captain. The physician cannot be everywhere at once but can be hailed over the radio and arrive quickly where needed. Some excursions involve hikes of several hours' duration for those fit enough, in addition to short walks for others. The physician must decide where he or she is to be optimally located; in reality an accident could occur hours away. Expedition staff are all trained in first aid and are able to operate the AED, which is always brought ashore.

The AED is part of a medical kit that is kept close at hand; this bag contains tools for airway management, rigid cervical collars, IV fluid and drugs for RSI and analgesia. There are thoracostomy kits and material for splinting and suturing, as well as a hypothermia blanket.

A MEDICAL EMERGENCY

On a recent Arctic excursion I was enjoying a Zodiac cruise on a perfectly clear sunny day. As we approached the ship I was radioed by a crew member — would I please return to the ship immediately to attend a passenger in the “mud room,” the area of the ship where passengers remove life jackets and boots before proceeding inside. I was met with a COPD patient in obvious severe respiratory distress. His colour was grey and his lips cyanotic. He was able to speak in single words only; he looked at

me and said, “oxygen.” One hand held a salbutamol inhaler, but he was too dyspnoeic to use it effectively. Auscultating his chest revealed only the thrum of the ship's engines. His wife told me that he had become dyspnoeic after ascending the gangway; he later admitted to a cough that started shortly after our journey began. He had only just finished a course of antibiotics and prednisone, and had a history of atrial fibrillation for which he took Coumadin. He had never been admitted to the ICU, but his wife related that he had been “just as sick” just 10 days before departure.

I guided him to take continuous puffs of Ventolin and gave him prednisone from the shore kit. He declined going to the infirmary where I could give him oxygen; in fact, getting him there would have been difficult because he couldn't walk, and navigating a stretcher around small corridors aboard a ship is problematic. He felt he would settle down if he was just allowed to relax and “catch his breath.” I complied with this wish, though I knew that had he presented to my ED in this much distress he would have been whisked to the resuscitation room and given Bipap while I prepared for intubation.

THE COMPLEXITIES OF EVACUATION

This emergency happened off the coast of Baffin Island. Had the patient needed emergency evacuation, as I initially felt was likely, the Captain and expedition leader would have decided the means for this. This is a complex decision that depends on weather and sea conditions, the location of the ship and the nature of the patient's illness or injury. In general it is preferable to evacuate the patient to land because the level of care at even its most basic, for example a nursing station in the Canadian



Tia Renouf

Beechey Island, Lancaster Sound, site of the lost Franklin Expedition. Cross is made from some of the infamous tin cans, whose lead soldering contributed greatly to the death of Franklin and his crew.

North, is probably more advanced than shipboard. Because of changeable weather in Polar latitudes, there may be only a brief window of opportunity for evacuation from the ship, compared with more options for potential air evacuation (to higher levels of care) from land. This contrasts greatly with the situation aboard luxury liners, which are very well equipped and can care for ICU patients for greater periods of time, often until a port is reached.

Only basic care can be provided aboard small vessels travelling to extreme Northern and Southern latitudes. I was able to provide MDI salbutamol and oral prednisone to the patient described above, and could have performed an RSI. There was an AED to treat life-threatening arrhythmias. However, suction was rudimentary, as was the oxygen delivery system. There was no ventilator. Drugs were in limited supply. Only the first steps of critical care management can be provided on small ships, and transfer to land is the next step. There exists a debate in the literature whether small expedition vessels ought to have only a basic infirmary or a fully-stocked ICU as exists on large cruise ships.¹

The realities of Polar travel are that definitive care can be a very long way away. Patients may or may not be able to be evacuated, depending on weather and the ship's location. In Antarctica there are some 40 research stations with well-equipped infirmaries, designed for semi-permanent residents. While there is usually a high degree of international

cooperation in an emergency, their mandate is not to provide care for tourists.

CARING FOR THE STAFF

In addition to being comfortable working with minimal tools, the ship's physician must be sensitive to the needs of the expedition staff. These people live aboard the ship for several months of the year, with little privacy. They are like a close-knit family. Staff interact with passengers constantly and must be personable and helpful regardless of stresses they may feel themselves. There is little opportunity for staff to find solitude and tend to their own needs. The Expedition Physician must be aware of this and, when necessary, act as the crews' counsellor and confidante. They are ideally able to do this because most Expedition Physicians are aboard for a short period of time and are relatively anonymous.

The medical log kept aboard small expedition vessels reveals a list of ailments that would present to any ED or doctor's office. There is no disease unique to the Polar environment; sun and cold-related problems are uncommon, probably because travellers are generally well-prepared to deal with the environment.² There have been reports of cardiac arrest, acute MI, DKA, anaphylaxis, malaria, ruptured ectopic pregnancy, acute appendicitis, significant head injury and laceration, and fracture dislocations, but mostly one sees URTIs, motion sickness, small lacerations, sprains and nonspecific complaints.³

INSURANCE COVERAGE

Litigation is a difficult issue for Expedition Physicians. It is difficult if not impossible to get malpractice coverage while practising at sea. Patients may have a variety of levels of expectation. They are on holiday and expect high-quality care, but may not be fully aware of the realities of treating injuries and illnesses at Polar latitudes. Many companies ask



Tia Renouf

A glacier in the Canadian Arctic.



Tia Renouf

Iceberg in Pond Inlet ("Mittimatalik"), which is in the Baffin Region of the Canadian Arctic.

passengers to get “medical clearance” in order to travel. They must also buy insurance to cover the cost of medical evacuation.

There is a medical manifest available to the Expedition Physician; travellers are supposed to make the physician aware of any ongoing medical problems and medications. There are disincentives to being candid in completing these forms, however, and so many are incomplete.⁴ The traveller wants to go on the journey and may not be frank about potential medical problems that may stop him or her. This leaves the Expedition Physician vulnerable; one might have sicker passengers than anticipated, have little in the way of medical equipment, and be exposed to litigation without malpractice coverage. Litigation would be extremely complex but, in fact, has never happened in the industry. Passengers are travelling in International waters aboard a Russian ship chartered by a company from a different country. A lawsuit in this setting is sufficiently complex to deter many cases. However, the passengers probably have a mixture of expectations about the medical “safety net” aboard the ship. Some of these expectations may not be realistic, and a poor outcome, more likely at sea than on land, could lead to litigation.

COULD YOU DO THIS?

What are the ideal characteristics of an Expedition Physician? Emergency physicians are most often recruited for their mix of expertise in acute care and the general nature of their skills. There is no “high tech” equipment available aboard a ship, so a degree of creativity is desirable in maximizing what is at hand. An urban EP might not be ideal for the job if he or she is heavily reliant on laboratory tests and radiology to diagnose and manage patients. Rural or remote physicians have a certain comfort level in being able to “fly by the seat of their pants” but may have rusty procedural skills.

There are often other physicians travelling as passengers on Polar voyages. Sometimes it is feasible to request their help, especially in dealing with mass casualties. In dealing with my COPD patient I was offered assistance by an internist who theorized that it would be useful to know the patient’s baseline CO₂ level, as features of his presentation (pre-syncope before his acute respiratory distress) were in keeping with CO₂ narcosis. After some thought (possibly triggered by the look of incredulity on my face) he realized that would not have affected management in this setting, where my only tools were Ventolin inhalers, steroids and a Russian oxygen delivery system with Cyrillic operating instructions!

There were 2 other physician passengers, a urologist and a neurologist. In caring for my patient, I was essentially alone. While I sat with him, guiding yet another puff of salbutamol, I did a lot of reflecting on what indeed might be ideal characteristics of an Expedition Physician. At the time, “anyone but me” seemed an ideal answer; however, I was grateful for my mixed background in emergency and remote/rural medicine. Thanks more to good luck and some element of reversible bronchospasm within my patient’s COPD, the patient eventually settled down and was able to be managed aboard ship without a medical evacuation.

Memorial University of Newfoundland offers a unique 18-month program in Emergency Medicine and Enhanced Skills. This course offers a standard EM program in addition to 6 months of extra training in whatever skills a rural physician would like to enhance in order to maximize their practice. For example candidates could complete training in Anaesthesia, Plastics, ICU, Endoscopy or Ob/Gyn, to name a few. It is hoped that physicians having completed this training would have a greater comfort level practising rurally, given their enhanced skills. Such a physician might do well as an Expedition Physician.

PERKS OF THE JOB

Working as Expedition Physician is both extremely gratifying and fraught with risk. Travelling in Polar regions, I have experienced magical natural wonders that I might never have seen otherwise. Calving glaciers, pods of endangered species of whale, northern lights, all seen from the bow of a ship travelling silently through extreme Northern and Southern latitudes; experiencing these have been some of my life’s sentinel moments. I have followed the routes of explorers like Scott Shackleton and Franklin, and seen their graves or wondered where their graves might be. Sometimes I have worried that I may have to deal with a poor outcome in case of emergency, or that I have no malpractice coverage. Such are the realities of being an Expedition Physician.

Competing interests: None declared.

REFERENCES

1. Lamberth P. Death in Antarctica. *Med J Aust* 2001;175:583-4.
2. Lugg DJ. Antarctica: Australia’s remote medical practice. Hobart, Tasmania: Antarctic Division; 1993. p. 12.
3. Curry C, Johnston M. Emergency doctors by sea to Antarctica: small ship medicine in polar regions. *Emerg Med (Fremantle)* 2001;13:233-6.
4. Levinson JM, Ger E, editors. *Safe passage questioned: medical care and safety for the polar tourist*. Centreville (MD): Cornell Maritime Press; 1998.